MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

TDC1231 – DATA COMMUNICATIONS AND NETWORKING

(All sections / Groups)

6 March 2018
2:30 p.m – 4:30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 3 pages with 5 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Write your answers in the Answer Booklet provided.

Question 1 **[10 Marks]**

a) Describe the responsibilities of network layer in Internet model. [1 Mark]

b) Give **ONE (1)** advantage and **ONE (1)** disadvantage of using mesh topology. [2 Marks]

c) Assuming that a cable loss its energy of -0.1 dB in each kilometer its travelled. The total distance between a sender and receiver is 35 km. State the original signal power if the receiver received the signal is 90 W. [3 Marks]

d) Transmission A has a signal-to-noise ratio (SNR) of 10,000 and transmission B has a SNR of 500. Which transmission is considering more ideal? Explain your answer. [2 Marks]

e) State **TWO (2)** characteristics of radiowave. [2 Marks]

Question 2 **[10 Marks]**

a) Describe the main problem of Non-Return-to-Zero (NRZ) encoding scheme. [1 Mark]

b) Draw the AMI encoding scheme for a bit stream 00110011. [3 Marks]

c) Identify the Nyquist sampling rate for a band-pass signal with lowest frequency of 200KHz and bandwidth of 250KHz. [2 Marks]

d) Distinguish between asynchronous and synchronous transmission in serial transmission. [2 Marks]

e) Which of the digital-to-analog conversion techniques is most susceptible to noise? Explain your answer. [2 Marks]

Continued...

Question 3 **[10 Marks]**

a) Assume *J1* is communicating with *J2*. Explain piggybacking and its usefulness in the communication between *J1* and *J2*. [3 Marks]

b) Four equal-size datagrams belonging to the same message leave for the destination one after another. However, they travel through different paths as shown in Table 1 below. The delay for each switch (including waiting and processing) is shown in Table 2.

Table 1

Datagram	Path Length (Km)	Visited switches
1	3200	1, 3, 5
2	11700	1, 2, 5
3	12200	1, 2, 3, 5
4	10200	1, 4, 5

Table 2

Switch	Delay (ms)
1	3
2	10
3	20
4	7
5	20

Assuming that all datagrams start at time 0 and the propagation speed is 2×10^8 m, identify the order the datagrams arrive at the destination. [4 Marks]

c) The actual communication in a circuit-switched network requires three phases: connection setup, data transfer, and connection teardown. Distinguish the phases when this type of network requires end-to-end addressing. Provide justification for your answer. [3 Marks]

Question 4 **[10 Marks]**

a) Wavelength-division multiplexing (WDM) is conceptually the same as Frequency-division multiplexing (FDM). What is the major difference between WDM and FDM? Explain the reasons why WDM is preferred over FDM. [2 Marks]

b) A multiplexer combines four 100-kbps channels using a time slot of 2 bits.

(i) Show the output with four arbitrary inputs. [2 Marks]

(ii) What is the frame rate? [1 Mark]

(iii) If each frame carries 8 bits, what is the bit rate? [1 Mark]

c) P_1 needs to send this four data items: 3456, ABCC, 02BC, and EEEE to P2. Find the checksum at the sender and receiver site if there is no error. [4 Marks]

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Question 5 **[10 Marks]**

a) Figure 1 illustrates the use of a bridge to connect three LANs. State **THREE (3)** consequences of replacing the bridge with a router. [3 Marks]

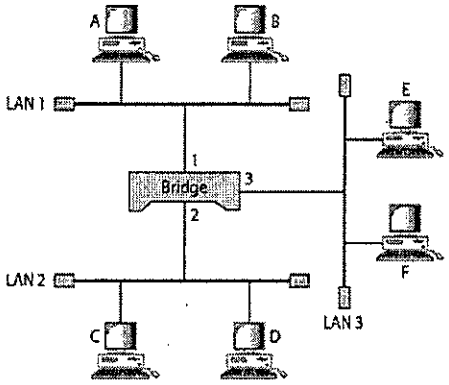

Figure 1

b) Describe **TWO (2)** types of links between a Bluetooth primary and a Bluetooth secondary. [2 Marks]

c) Match the layers in Bluetooth and the Internet model. [3 Marks]

d) Compare random access method with controlled access method. [2 Marks]

End of Paper.